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EXAMINER	
BAND, MICHAEL A	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/803,805	MOSDEN, AELAN	
	Examiner	Art Unit	
	MICHAEL BAND	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 18, 20, 30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant recites transferring a maintenance item via wafer handling motions. There is no support for this limitation in the specification.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-13, 15-17, 29, and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ficnh (US Patent No. 5,085,410) in view of Mooring et al (US Patent No. 6,267,545).

With respect to claim 1, Ficnh discloses a modular processing system having a vacuum environment (abstract), capable in the fabrication of electronic components and circuits (col. 1, lines 11-18). Fig. 1 depicts a processing module where the invention provides a method and apparatus for replacing internal components of each modular chamber without system stripdown (col. 1, lines 67-68; col. 2, line 1), with substrate (i.e. wafer) assemblies [40A], 40[B]. It is inherent that a substrate assembly have a substrate support. Since the invention provides for internal components (i.e. maintenance items) to be replaced, it is inherent that they are configured to be removably mounted upon some mounting structure. Ficnh also discusses transferring the substrates during processing from a transfer cask (i.e. transfer system) through a vacuum lock and placed side-by-side in a vacuum chamber (i.e. processing module) (abstract). Fig. 2 depicts each modular unit [12] is provided with two transfer casks (i.e. transfer systems) [130] which permit the assemblies (i.e. maintenance items) [30], [40] to be removed through the valved module vacuum locks [126]-[129] without loss of vacuum in the module (col. 2, lines 21-29) or processing lines (col. 2, lines 17-22). Ficnh further discloses that probes (i.e. arms) (fig. 2, [120], [122]) serve as transfer mechanisms from the modular

chamber through valved vacuum locks and into transfer casks (col. 2, lines 29-35). However Ficnh is limited in that while the apparatus disclosed is suggested to be use for fabricating electronic components, it is not specifically suggested to fabricate semiconductor on wafer substrates.

Mooring et al teaches a semiconductor processing platform having processing module isolation capabilities via an interlocked control system with valves contained in a vacuum body between each of a plurality of adjacent process and transport modules (abstract). Under control of the system, the valve allows separate operation of the transport module and certain ones of the process modules, while a selected one of the process modules is in either a maintenance state or locked out state for servicing (abstract). Furthermore, Mooring et al teaches transferring of a wafer (i.e. substrate) from a transport module [202] to a process module [206] (col. 14, lines 54-67; col. 15, lines 1-9). The substrate must be placed on some platform (i.e. support) inside the process module. Mooring et al cites the advantage of using separate valves (i.e. isolation capabilities) as avoiding downtime due to a pump cycle needed to bring the transport chamber to the needed vacuum state along with no other operations needing to be performed upon the transport chamber (col. 3, lines 12-19).

It would have been obvious to one of ordinary skill in the art to incorporate a wafer (i.e. substrate) transfer mechanism taught in Mooring et al into the apparatus of Ficnh in order to gain the advantages of maintaining a vacuum pressure in the transport chamber (i.e. transfer cask) along with no additional operations needed upon the transport chamber.

With respect to claim 2, modified Ficnh further discloses in fig. 2 an isolation assembly comprising valved vacuum locks (i.e. gate valve assembly) [126]-[129] between the transfer cask (i.e. transfer system) [130] and modular chamber (i.e. processing module) [12] (col. 2, lines 28-34).

With respect to claim 3, modified Ficnh further discloses transferring an extractor or vaporizer assemblies (i.e. maintenance item) from a process module to transfer cask without loss of vacuum for equipment maintenance (abstract; col. 2, lines 17-28). It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask transfers the maintenance item (i.e. assemblies) to a maintenance system. Since the assemblies are stored in the maintenance system for repair, the maintenance system is a storage assembly and therefore is inside the maintenance system. Fig. 2 depicts extractor or vaporizer assemblies (i.e. first and second maintenance item) [30], [40] removed via an exchange system [126]-[129]. It is also either inherent or obvious to use an exchange system of similar design to fig. 2 to transfer the maintenance item from the transfer cask to a maintenance system to limit the loss of vacuum.

With respect to claim 4, modified Ficnh further discloses an isolation assembly comprising valved vacuum locks (i.e. gate valve assembly) between the transfer cask (i.e. transfer system) and modular chamber (i.e. processing module) that contain the vacuum for when equipment components need maintenance (abstract; col. 2, lines 28-34, fig. 2, [126]-[129]. It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask

transfers the maintenance item (i.e. assemblies) to a maintenance system. It is also either inherent or obvious to use an exchange system of similar design to fig. 2 to transfer the maintenance item from the transfer cask to a maintenance system and vice versa.

With respect to claim 5, modified Ficnh further depicts in fig. 2 an exchange system comprising valved locks [126]-[129] and arms [120], [122] to facilitate removal of assemblies for equipment maintenance (abstract). A controller [135] controls hydraulic cylinders [42], [144], [150], [152], which in turn drive respective arms [120], [122] (col. 9, lines 18-23; col. 7, lines 25-28), thus a drive system is used. An end effector [180] is also seen in fig. 2 which is coupled to a transfer arm [120]. Ficnh states that the arms are capable of movement in both a horizontal direction and vertical direction (col. 7, lines 21-25). It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask transfers the maintenance item (i.e. assemblies) from a process module to a maintenance system and vice versa.

With respect to claim 6, Ficnh further depicts in fig. 2 an exchange system comprising valved locks [126]-[129] and arms [120], [122] to facilitate removal of substrate assemblies for equipment maintenance (abstract). A controller [135] controls hydraulic cylinders [42], [144], [150], [152], which in turn drive respective arms [120], [122] (col. 9, lines 18-23; col. 7, lines 25-28), thus a drive system is used. An end effector [180] is also seen in fig. 2, which is coupled to a transfer arm [120]. Ficnh states that the arms are capable of movement in both a horizontal direction and vertical

direction (col. 7, lines 21-25). However Ficnh is limited in that while it discusses removing substrate assemblies, and therefore is capable of removing substrates (abstract), along with the invention being used for the fabrication of electronic components and circuits (col. 1, lines 15-17), Ficnh does not specifically suggest transferring a substrate between a transfer plate in the transfer system and a substrate holder in the process module.

Mooring et al teaches a semiconductor processing platform having processing module isolation capabilities via an interlocked control system with valves contained in a vacuum body between each of a plurality of adjacent process and transport modules (abstract). Under control of the system, the valve allows separate operation of the transport module and certain ones of the process modules, while a selected one of the process modules is in either a maintenance state or locked out state for servicing (abstract). Furthermore, Mooring et al teaches transferring of a wafer from a transport module [202] to a process module [206] (col. 14, lines 54-67; col. 15, lines 1-9). The substrate must be placed on some platform (i.e. support) inside the process module. Mooring et al cites the advantage of using separate valves (i.e. isolation capabilities) as avoiding downtime due to a pump cycle needed to bring the transport chamber to the needed vacuum state along with no other operations needing to be performed upon the transport chamber (col. 3, lines 12-19).

It would have been obvious to one of ordinary skill in the art to incorporate a wafer (i.e. substrate) transfer mechanism taught in Mooring et al into the apparatus of Ficnh in order to gain the advantages of maintaining a vacuum pressure in the transport

chamber (i.e. transfer cask) along with no additional operations needed upon the transport chamber.

With respect to claim 7, modified Ficnh further depicts in fig. 2 an exchange system comprising valved locks [126]-[129] and arms [120], [122] to facilitate removal of assemblies for equipment maintenance (abstract). A controller [135] controls hydraulic cylinders [42], [144], [150], [152], which in turn drive respective arms [120], [122] (col. 9, lines 18-23; col. 7, lines 25-28), thus a drive system is used. An end effector [180] is also seen in fig. 2 which is coupled to a transfer arm [120]. Ficnh states that the arms are capable of movement in both a horizontal direction and vertical direction (col. 7, lines 21-25). Ficnh further discusses transferring an extractor or vaporizer assemblies (i.e. maintenance item) from a process module to transfer cask without loss of vacuum for equipment maintenance (abstract; col. 2, lines 17-28). It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask transfers the maintenance item (i.e. assemblies) from a process module to a maintenance system and vice versa. Since the assemblies are stored in the maintenance system for repair, the maintenance system is a storage assembly and therefore is inside the maintenance system.

With respect to claim 8, modified Ficnh further discloses a transfer cask (i.e. transfer system) with an arm (i.e. transfer plate) [120], [122] for moving the extractor or vaporizer assemblies [40] or [30] from one position (i.e. modular chamber) to another position (i.e. transfer cask) (col. 2, lines 28-34).

With respect to claim 9, modified Ficnh further depicts in fig. 2 a vaporizer assembly [30] that has a shield [26] and an electrical ground plate with the associated cooling and electrical services (i.e. insulators) (abstract). The extractor assemblies [40A], [40B] have plates (fig. 2, [42], [43]; col. 9, lines 18-23).

With respect to claim 10, modified Ficnh further depicts in fig. 2 a controller [135] coupled to a module [12] and transfer cask [130]. Ficnh also discusses how the controller controls the arms to remove the extractor assembly (i.e. maintenance item) while "maintain[ing] a vacuum seal between the casks 130 and chamber interiors 18" (col. 6, lines 62-68; col. 7, lines 1-39). Modified Ficnh also notes that both extractor and vaporizer assemblies have transfer casks (col. 2, lines 21-25), thus the method for removing a vaporizer assembly is similar to the method for an extractor assembly.

With respect to claims 11 and 12, modified Ficnh further discloses a cylindrical plate [43] (i.e. maintenance item) from extractor (i.e. substrate) assemblies (col. 8, lines 6-20; abstract). The vaporizer unit consists of a thermal/vapor shield [26] and an electrical ground plate along with associated cooling and electrical services (i.e. insulators). Fig. 2 depicts cylindrical plate [43] mounted in chamber [18] in an area that is prone to laser radiation by laser paths [15] (col. 4, lines 16-17). Since the cylindrical plate is part of the assembly, arms [120], [122] remove (i.e. lift) the assembly from the module to a transfer cask (col. 6, lines 62-68; col. 7, lines 1-39; col. 8, lines 6-11). Modified Ficnh also describes how the invention is used in the fabrication of electronic components and circuits (i.e. semiconductors) (col. 1, lines 15-18). It is either inherent or obvious that the substrate assembly comprises a wafer that is either processed via

etching or deposition as evidenced by Mooring et al (US Patent No. 6,267,545; col. 1, lines 26-36).

With respect to claim 13, modified Ficnh further discloses that the arms (i.e. probes) [120], [122] support (i.e. mount) the assemblies and are configured to move from the modular chamber to transfer cask (col. 2, lines 21-35). Fig. 2 also depicts said arms mounting the assemblies during processing.

With respect to claims 15 and 16, Ficnh further depicts in fig. 2 depicts cylindrical plate (i.e. maintenance item) [43] mounted in chamber [18] near the top of the chamber. Furthermore Ficnh discusses a mounting structure (i.e. arms, [120], [122]) for releaseably holding the extractor assembly [40] (fig. 2). Since the mounting structure holds the extractor assembly, it therefore holds the cylindrical plates as well. The arms are capable of moving horizontally and vertically (col. 7, lines 22-25). However Ficnh is limited in that while it is discussed that this process is used for the fabrication of electronics and circuits (col. 1, lines 16-18), it is not suggested to include a substrate (i.e. wafer) moving mechanism.

Mooring et al teaches a semiconductor processing platform having processing module isolation capabilities via an interlocked control system with valves contained in a vacuum body between each (abstract). Under control of the system, the valve allows separate operation of the transport module and certain ones of the process modules, while a selected one of the process modules is in either a maintenance state or locked out state for servicing (abstract). Furthermore, Mooring et al teaches transferring of a wafer from a transport module [202] to a process module [206] (col. 14, lines 54-67; col.

15, lines 1-9). In addition, Mooring et al states that a robot arm located within the transport module may be employed to retrieve a selected substrate from storage and place it into one of the multiple process modules (col. 1, lines 26-52). Mooring et al cites the advantage of using separate valves (i.e. isolation capabilities) as avoiding downtime due to a pump cycle needed to bring the transport chamber to the needed vacuum state along with no other operations needing to be performed upon the transport chamber (col. 3, lines 12-19).

It would have been obvious to one of ordinary skill in the art to incorporate the robot arm for transferring a substrate taught in Mooring et al for transferring assemblies, and thus maintenance items, of Ficnh in order to gain the advantages of maintaining a vacuum pressure in the transport chamber (i.e. transfer cask) along with no additional operations needed upon the transport chamber.

With respect to claim 17, modified Ficnh further discloses a vaporizer assembly (i.e. thermal processing module) (abstract). Since modified Ficnh also discusses how the process is used for the fabrication of electronic components and circuits, it is either inherent or obvious that a deposition (i.e. coating) module or an etching (i.e. patterning) module is present as evidenced by Mooring et al (US Patent No. 6,267,545; col. 1, lines 26-36).

With respect to claim 29, Ficnh further discloses an isolation assembly comprising valved vacuum locks (i.e. gate valve assembly) between the transfer cask (i.e. transfer system) and modular chamber (i.e. processing module) (col. 2, lines 28-34). Extractor or vaporizer assemblies (i.e. first maintenance item) [30] or [40] are

removably mounted to an exchange system [126]-[129] using the isolation assembly. It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask transfers the maintenance item (i.e. assemblies) to a maintenance system and vice versa. Fig. 2 depicts the second exchange system for transferring the maintenance item to the transfer cask while maintaining no loss of vacuum (col. 2, lines 17-28). It is also either inherent or obvious to use an exchange system and isolation assembly of similar design to fig. 2 to transfer the maintenance item from the transfer cask to a maintenance system to limit the loss of vacuum while the converse is true. Ficnh further discloses that arms [120], [122] are free to rotate horizontally and vertically about respective pivots [132], [134] and are attached to a transfer cask (col. 7, lines 19-25) and a first maintenance item [30] or [40] inside a process module (fig. 2). Ficnh also discusses another transfer cask (i.e. transfer system) with an arm (i.e. transfer plate) [120], [122] for moving the new extractor or vaporizer assemblies (i.e. second maintenance item) [30] or [40] from a second position (i.e. transfer cask) to a first position (i.e. process module) (col. 2, lines 28-34 and 48-60). However Ficnh is limited in that while the apparatus disclosed is suggested to be use for fabricating electronic components, it is not specifically suggested to fabricate semiconductor on wafer substrates.

Mooring et al teaches a semiconductor processing platform having processing module isolation capabilities via an interlocked control system with valves contained in a vacuum body between each of a plurality of adjacent process and transport modules (abstract). Under control of the system, the valve allows separate operation of the

transport module and certain ones of the process modules, while a selected one of the process modules is in either a maintenance state or locked out state for servicing (abstract). Furthermore, Mooring et al teaches transferring of a wafer (i.e. substrate) from a transport module [202] to a process module [206] (col. 14, lines 54-67; col. 15, lines 1-9). The substrate must be placed on some platform (i.e. support) inside the process module. Mooring et al cites the advantage of using separate valves (i.e. isolation capabilities) as avoiding downtime due to a pump cycle needed to bring the transport chamber to the needed vacuum state along with no other operations needing to be performed upon the transport chamber (col. 3, lines 12-19).

It would have been obvious to one of ordinary skill in the art to incorporate a wafer (i.e. substrate) transfer mechanism taught in Mooring et al into the apparatus of Ficnh in order to gain the advantages of maintaining a vacuum pressure in the transport chamber (i.e. transfer cask) along with no additional operations needed upon the transport chamber.

With respect to claim 32, modified Ficnh further depicts in fig. 2 an exchange system comprising valved locks [126]-[129] and arms [120], [122] to facilitate removal of assemblies for equipment maintenance (abstract). A controller [135] controls hydraulic cylinders [42], [144], [150], [152], which in turn drive respective arms [120], [122] (col. 9, lines 18-23; col. 7, lines 25-28), thus a drive system is used. An end effector [180] is also seen in fig. 2 which is coupled to a transfer arm [120]. Since modified Ficnh also describes how the invention is used in the fabrication of electronic components and circuits (i.e. semiconductors) (col. 1, lines 15-18), it is either inherent or obvious that the

substrate assembly comprises a wafer (i.e. semiconductor) that is either processed via etching or deposition as evidenced by Mooring et al (US Patent No. 6,267,545; col. 1, lines 26-36).

With respect to claim 33, modified Ficnh further depicts in fig. 2 an exchange system comprising valved locks [126]-[129] and arms [120], [122] to facilitate removal of assemblies for equipment maintenance (abstract). A controller [135] controls hydraulic cylinders [42], [144], [150], [152], which in turn drive respective arms [120], [122] (col. 9, lines 18-23; col. 7, lines 25-28), thus a drive system is used. End effectors [180] are also seen in fig. 2 which are coupled to transfer arms [120], [122]. Since modified Ficnh also describes how the invention is used in the fabrication of electronic components and circuits (i.e. semiconductors) (col. 1, lines 15-18), it is either inherent or obvious that the substrate assembly comprises a wafer (i.e. semiconductor) that is either processed via etching or deposition as evidenced by Mooring et al (US Patent No. 6,267,545; col. 1, lines 26-36).

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ficnh (US Patent No. 5,085,410) and Mooring et al (US Patent No. 6,267,545) as applied to claim 13 above, and further in view of Gujer et al (US Patent No. 6,958,098).

With respect to claim 14, the references are cited as discussed for claim 13. However modified Ficnh is limited in that while it discloses removing extractor assemblies, and therefore cylindrical plates (col. 8, lines 6-20; abstract), via arms (parts 120 and 122), it is not discussed that the maintenance item is a cylindrical ring.

Gujer et al teaches a semiconductor wafer support with a modular lift-pin assembly (abstract) with a substrate support assembly [148] comprising a substrate support [150] (fig. 1). A lift-arm assembly [431] actuates the lift-pin assembly [402], which comprises a plurality of wear pads [432] disposed on a lift-pin ring (i.e. maintenance item) [133] (col. 8, lines 14-19). The lift-pin ring is actuated towards the substrate surface to lift the substrate [101] from the support surface [712] (col. 8, lines 15-21). Furthermore, Gujer et al states that the lift pins are supported on a lifter ring, which is attached to a robotic arm (i.e. wafer transfer arm) (col. 1, lines 31-45). Gujer et al cites the advantage of this device as the lift-pins not binding together in addition to providing ease of serviceability (col. 1, lines 61-67; col. 2, lines 1-3).

It would have been obvious to one of ordinary skill to use the lift-pin assembly taught in Gujer et al to remove a substrate assembly (and substrate) of Ficnh in order to gain the advantages of the lift-pins not binding and providing ease of serviceability for the apparatus.

7. Claims 18-28 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ficnh (US Patent No. 5,085,410) in view of Tepman (EP No. 511733), equivalent to Tepman (US Patent No. 5,223,112) as translated.

With respect to claim 18, Ficnh discloses a modular processing system having a vacuum environment (abstract), capable in the fabrication of electronic components and circuits (col. 1, lines 11-18). Fig. 1 depicts a processing module where the invention provides a method and apparatus for replacing internal components of each modular chamber without system stripdown (col. 1, lines 67-68; col. 2, line 1), with substrate (i.e.

wafer) assemblies [40A], 40[B]. It is inherent that a substrate assembly have a substrate support. Since the invention provides for internal components (i.e. maintenance items) to be replaced, it is inherent that they are configured to be removably mounted upon some mounting structure. Ficnh also discusses transferring the substrates during processing from a transfer cask (i.e. transfer system) through a vacuum lock and placed side-by-side in a vacuum chamber (i.e. processing module) (abstract). Fig. 2 depicts each modular unit [12] is provided with two transfer casks (i.e. transfer systems) [130] which permit the assemblies (i.e. maintenance items) [30], [40] to be removed through the valved module vacuum locks [126]-[129] without loss of vacuum in the module (col. 2, lines 21-29) or processing lines (col. 2, lines 17-22). Ficnh further discloses that probes (i.e. arms) (fig. 2, [120], [122]) serve as transfer mechanisms from the modular chamber through valved vacuum locks and into transfer casks (col. 2, lines 29-35). However Ficnh is limited in that while the apparatus disclosed is suggested to be use for fabricating electronic components, it is not specifically suggested to use a wafer transfer arm to pick up the maintenance item.

Tepman teaches a removable shutter apparatus for a semiconductor process chamber, with the shutter used to temporarily block the wafer processing aperture. (Basic-Abstract). Since the shutter plate is geometrically sized identical to process wafers (i.e. substrates), periodic removal and replacement (i.e. maintenance) of the shutter plate is done using a robot wafer handling mechanism (Basic-Abstract). Tepman cites the advantage of this removing mechanism as allowing shutter plates to be replaced without shutting down the process (Basic-Abstract).

It would have been obvious to one of ordinary skill in the art to use the wafer arm of Tepman for the maintenance transfer system of Ficnh to gain the advantage of replacing maintenance items without shutting down the process.

With respect to claim 19, modified Ficnh further discloses a cylindrical plate [43] (i.e. maintenance item) from extractor (i.e. substrate) assemblies (col. 8, lines 6-20; abstract). The vaporizer unit consists of a thermal/vapor shield [26] and an electrical ground plate along with associated cooling and electrical services (i.e. insulators). Fig. 2 depicts cylindrical plate [43] mounted in chamber [18] in an area that is prone to laser radiation by laser paths [15] (col. 4, lines 16-17). Since the cylindrical plate is part of the assembly, arms [120], [122] remove (i.e. lift) the assembly from the module to a transfer cask (col. 6, lines 62-68; col. 7, lines 1-39; col. 8, lines 6-11). Modified Ficnh also describes how the invention is used in the fabrication of electronic components and circuits (i.e. semiconductors) (col. 1, lines 15-18). It is either inherent or obvious that the substrate assembly comprises a wafer that is either processed via etching or deposition as evidenced Tepman (US Patent No. 5,223,112; Basic-Abstract).

With respect to claim 20, modified Ficnh further discloses a transfer cask for a new extractor assembly (i.e. second maintenance item) to be placed into the process module without exposure to an outside environment, with the extractor assembly removably mounted in the module chamber (col. 2, lines 21-28 and 48-60). It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask transfers the maintenance item (i.e. assemblies) to a maintenance system and vice versa.

With respect to claim 21, modified Ficnh further discloses a transfer cask (i.e. transfer system) with an arm (i.e. transfer plate) [120], [122] for moving the extractor or vaporizer assemblies (i.e. first maintenance item) [40] or [30] from one position (i.e. modular chamber) to another position (i.e. transfer cask) (col. 2, lines 28-34).

With respect to claim 22, modified Ficnh further discloses another transfer cask (i.e. transfer system) with an arm (i.e. transfer plate) [120], [122] for moving the new extractor or vaporizer assemblies (i.e. second maintenance item) [40A], [40B], [30] from a second position (i.e. transfer cask) to a first position (i.e. process module) (col. 2, lines 28-34 and 48-60).

With respect to claim 23, modified Ficnh further discloses transferring an extractor or vaporizer assemblies (i.e. maintenance item) from a process module to a transfer cask without loss of vacuum for equipment maintenance (abstract; col. 2, lines 17-28). It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask transfers the maintenance item (i.e. assemblies) to a maintenance system and vice versa. Since the assemblies are stored in the maintenance system for repair, the maintenance system is a storage assembly and therefore is inside the maintenance system.

With respect to claim 24, modified Ficnh further discloses substrate (i.e. extractor) assemblies which are transferred from a process module to a transfer cask (i.e. transfer system) via extensible probes (i.e. arms, [120], [122] without loss of vacuum (abstract; col. 2, lines 21-35).

With respect to claim 26, modified Ficnh further discloses a transfer cask (i.e. transfer system) with an arm (i.e. transfer plate) [120], [122] for moving the extractor or vaporizer assemblies (i.e. first maintenance item) [40] or [30] from a modular chamber to a transfer cask without loss of vacuum (col. 2, lines 28-34). Modified Ficnh also discloses that another transfer cask moves a new (i.e. second maintenance item) extractor or vaporizer assemblies into a chamber module (col. 2, lines 48-60). It is either inherent or obvious that some method of monitoring is used to determine when to replace the extractor or vaporizer assemblies for maintenance (i.e. a processing recipe).

With respect to claim 27, modified Ficnh further depicts in fig. 2 an extractor or vaporizer assemblies (i.e. first maintenance item) [30] or [40] removably mounted to a first exchange system [127]-[129]. The exchange system is coupled to a transfer cask [130] and process module [12].

With respect to claim 25, modified Ficnh further discloses a transfer cask (i.e. transfer system) with an arm (i.e. transfer plate) [120], [122] for moving the extractor or vaporizer assemblies (i.e. first maintenance item) [40] or [30] from a modular chamber to a transfer cask without loss of vacuum (col. 2, lines 28-34). Modified Ficnh also discloses that another transfer cask moves a new (i.e. second maintenance item) extractor or vaporizer assemblies into a chamber module (col. 2, lines 48-60). It is either inherent or obvious that some method of monitoring is used to determine when to replace the extractor or vaporizer assemblies for maintenance (i.e. a processing recipe). Furthermore since modified Ficnh also describes how the invention is used in the fabrication of electronic components and circuits (i.e. semiconductors) (col. 1, lines 15-

18), it is also either inherent or obvious that the substrate assembly comprises a wafer that is either processed via etching or deposition as evidenced by Tepman (US Patent No. 5,223,112; Basic-Abstract).

With respect to claim 28, modified Ficnh further depicts in fig. 2 an extractor or vaporizer assemblies (i.e. first and second maintenance items) [30], [40] removably mounted to a first exchange system [126]-[129] and another (i.e. second) exchange system [126]-[129]. Thus the first exchange system is in a first position and the second exchange system is in a second position. The extractor (or vaporizer) assembly is mounted on extensible probes (i.e. arms, fig. 2, [120], [122]) which transport the assembly from a process module to a transfer cask and vice versa (col. 2, lines 17-35). It is inherent or obvious that since the function of a transfer cask is to replace equipment in need of maintenance (abstract) that the transfer cask transfers the maintenance item (i.e. assemblies) to a maintenance system and vice versa. Fig. 2 depicts the second exchange system for transferring the maintenance item to the transfer cask while maintaining no loss of vacuum (col. 2, lines 17-28). It is also either inherent or obvious to use an exchange system of similar design to fig. 2 to transfer the maintenance item from the transfer cask to a maintenance system to limit the loss of vacuum. Depicted in fig. 2, the second maintenance item [30] or [40] is transferred from the transfer system [130] to the process module [12] via a first exchange system [126]-[129] without a loss of vacuum to the process module (col. 2, lines 22-28). Since modified Ficnh also describes how the invention is used in the fabrication of electronic components and circuits (i.e. semiconductors) (col. 1, lines 15-18), it is either inherent or obvious that the

electron beam guns of the vaporizer assembly either etches or deposits onto the substrate assembly as evidenced by Tepman (US Patent No. 5,223,112; Basic-Abstract).

With respect to claim 30, Ficnh discloses a modular processing system having a vacuum environment (abstract), capable in the fabrication of electronic components and circuits (col. 1, lines 11-18). Fig. 1 depicts a processing module where the invention provides a method and apparatus for replacing internal components of each modular chamber without system stripdown (col. 1, lines 67-68; col. 2, line 1), with substrate (i.e. wafer) assemblies [40A], 40[B]. It is inherent that a substrate assembly have a substrate support. Since the invention provides for internal components (i.e. maintenance items) to be replaced, it is inherent that they are configured to be removably mounted upon some mounting structure. Ficnh also discusses transferring the substrates during processing from a transfer cask (i.e. transfer system) through a vacuum lock and placed side-by-side in a vacuum chamber (i.e. processing module) (abstract). Fig. 2 depicts each modular unit [12] is provided with two transfer casks (i.e. transfer systems) [130] which permit the assemblies (i.e. maintenance items) [30], [40] to be removed through the valved module vacuum locks (i.e. ports) [126]-[129] without loss of vacuum in the module (col. 2, lines 21-29) or processing lines (col. 2, lines 17-22). Ficnh further discloses that probes (i.e. arms) (fig. 2, [120], [122]) serve as transfer mechanisms from the modular chamber through valved vacuum locks and into transfer casks along with said arms also serving as a mounting system (col. 2, lines 29-35). However Ficnh is limited in that while the apparatus disclosed is suggested to be use for fabricating

electronic components, it is not specifically suggested to use a wafer transfer arm to pick up the maintenance item.

Tepman teaches a removable shutter apparatus for a semiconductor process chamber, with the shutter used to temporarily block the wafer processing aperture. (abstract). Since the shutter plate is geometrically sized identical to process wafers (i.e. substrates), periodic removal and replacement (i.e. maintenance) of the shutter plate is done using a robot wafer handling mechanism (abstract). Tepman cites the advantage of this removing mechanism as allowing shutter plates to be replaced without shutting down the process (abstract).

It would have been obvious to one of ordinary skill in the art to use the wafer arm of Tepman for the maintenance transfer system of Ficnh to gain the advantage of replacing maintenance items without shutting down the process.

With respect to claim 31, modified Ficnh further depicts in fig. 2 an exchange system comprising valved locks [126]-[129] and arms [120], [122] to facilitate removal of assemblies for equipment maintenance (abstract). A controller [135] controls hydraulic cylinders [42], [144], [150], [152], which in turn drive respective arms [120], [122] (col. 9, lines 18-23; col. 7, lines 25-28), thus a drive system is used. An end effector [180] is also seen in fig. 2 which is coupled to a transfer arm [120].

Response to Arguments

112 Rejections

8. Applicant has amended claim 28 to overcome lack of antecedent basis. Therefore the rejection is withdrawn.

103 Rejections

9. On pages 13-14, the Applicant's argues that Ficnh teaches a maintenance system only for uranium (i.e. radioactive) enrichment systems and is therefore not applicable to a maintenance system for semiconductor processing.

The Examiner respectfully disagrees. As stated in Ficnh, a "modular processing system" (abstract) utilizing a vacuum system used commonly in uranium separation in addition to "the fabrication of electronic components and circuits [i.e. semiconductors]" (col. 1, lines 11-17). Mooring et al has also been combined with Ficnh with proper motivation given above since Ficnh does not distinctly point towards a wafer (i.e. semiconductor) transfer system.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795